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ABSTRACT

The study examined the speech production strategies used by 4 young children (30- to 32-months-old) with cleft palate and velopharyngeal inadequacy during the early stages of phonological learning. All the children had had primary palatal surgery and were producing primarily single word utterances with a few 2- and 3-word phrases. Analysis of each child's speech indicated the children's speech was unlike like that of non-cleft children in that they frequently substituted the more open sonovant consonants for the more closed obstruents, oral stops were frequently nasalized or produced with a secondary glottal constriction, and the place of articulation was maintained only for labials. The children's speech tended to be like that of non-cleft children in substituting stops for fricatives, in often preserving both voicing and place of articulation and in such phonological processes as assimilation and consonant reduction. Three references. (DB)

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PHONOLOGICAL PATTERNS OBSERVED IN YOUNG CHILDREN WITH CLEFT PALATE

Paper presented at the annual meeting of the American Speech-Language Hearing Association
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Children with cleft palate and velopharyngeal inadequacy (VPI) are forced to learn to produce the phonology of their language without the ability to effectively separate their oral and nasal cavities and without the ability to impound the air that is required for the production of obstruent consonants (i.e., oral stops, affricates, and fricatives). Studies suggest that when VPI occurs in adults, the result is an increase in the nasalization of sonorant consonants including liquids, glides, and vowels and weak or inaudible obstruent consonant production (Bernthal & Beukelman, 1977; Isshiki, Honjow, & Morimoto, 1968). However, young language learning children with VPI are in a unique position. Like other children of the same age, they are in an exploratory learning mode and are actively trying to modify their productions so that they will sound more like others. No two-year-old child produces accurate, adult-like speech. They all adopt strategies to bridge the gap between target sounds and their ability to produce those sounds. However, the strategies that work for a child with an adequate velopharyngeal mechanism may not work for the child with VPI. For example, non-cleft children often substitute oral stops for fricatives, maintaining voicing and place of articulation. However, oral stops may be difficult for the child with VPI.

This paper will describe and compare the speech production strategies used by several young children with cleft palate and velopharyngeal inadequacy during the early stages of phonological learning, it will attempt to identify those aspects of the phonological system that are preserved and those that are sacrificed in the child's attempt to produce audible, intelligible speech, and it will explore the range of production patterns that occur in this group of children.

METHOD

Subjects

FIGURE 1

The speech of four 30- to 32-month-old (mean = 30 months, 20 days) children with cleft palate and inadequate velopharyngeal function will be described. The children had had primary palatal surgery from 10 to 14 months before the samples were taken and all eventually had pharyngeal flap surgery. When the speech samples were taken, all of the children were producing primarily single word utterances with a few 2 and 3 word phrases and none of the children had been enrolled in a remedial program. The study examined only obstruent production (i.e., oral stops, fricatives, and affricates).

Speech Samples

Both imitative and spontaneous speech samples were available for all of the children. The imitative samples were more complete in that they sampled all of phonemes; the spontaneous samples were probably more representative of the child's typical productions. Both samples were considered in describing the child's speech. Speech was transcribed using IPA modified for use with children with cleft palate. The child's production of word-initial and word-final consonants will be described.

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RESULTS

FIGURE 2

The children in this study can all be described as 1) tending to substitute the more open sonorant consonants for the more closed obstruent consonants and as 2) maintaining a lawful relationship between their productions and the target sounds. Beyond that, they behaved in different ways or adopted different strategies.

Child 1

FIGURE 3

In general, Child 1 preserved information about place of articulation. Glottal stops were produced primarily for velar or palatal-alveolar consonants while labial and alveolar consonants were usually produced at the appropriate place of articulation. Voicing information was also preserved in that [+voice] obstruents were produced as [+voice] oral or nasal stops and [-voice] obstruents were [-voice] oral stops or [-voice] fricatives. Oral stops were often glottalized, that is, produced with a secondary glottal constriction, when the target was an oral stop or produced with audible nasal air when the target was a fricative. This helped to signal the stop-fricative contrast.

FIGURE 4

There were two interesting exceptions to this general pattern. The word "doggie" occurred several times as [?o?i] with two glottal stops. This could be described as an instance of assimilation similar to that observed in the non-cleft child who says [gogi] for "doggie", since Child 1 produced /g/ as [?]. The second exception involved the phrase "take it off". This was one of the few multi-word utterances produced by this child and occurred frequently as she played with a doll. The phrase was produced as some variant of [h ?inof].

This doesn't seem to follow the pattern that occurred in single words. Place is not correct, except for the /f/. The most likely explanation is that the [?] represents the /k/ in "take". The [h] replaces the /t/ and is like it only in that it is voiceless. This production may represent a manner assimilation since both the [h] and the [?] are considered Class II glides (Chomsky & Halle, 1968). The [n] is either an intrusion or a replacement for the /t/. In any case, the pattern is quite different from that found in single words.

Child 2

FIGURE 5

Child 2 also maintained a contrast between voiced and voiceless stops, but in a different way. He produced nasal stops or nasalized oral stops for all [+voice] stops and [h] for all [-labial] [-voice] stops word-initially. The same pattern occurred word-finally except that non-labial stops became [?]. Like the voiceless stops, non-labial ficatives became [h] word initially and [?] word finally, eliminating the voicing contrast among fricatives. Labial consonants were generally correct with audible air escape. It is interesting that it is only when place of articulation is viable that this child produces the correct sound. This was true for both voiceless stops and fricatives.

Child 3

FIGURE 6

Child 3 had a similar but perhaps less complex phonological system. All [+voice] obstruents (stops, fricatives, affricates) became nasal stops and all [-voice] obstruents became [h] word initially and [h] or [ ] word finally. The two exceptions were /p/ and /z/, /p/ was treated like a voiced obstruent in that it was produced as [m]. Again, a labial consonant is given a labial place of articulation. It may be that /m/ is the labial consonant that this child can produce and when a labial

is needed, the child uses /m/. /z/ was treated as a [-voice] obstruent and was produced as [h].

Labials appear to get special treatment by all of the children. The production of labial consonant is visible and children seem to produce them at a labial place of articulation regardless of their treatment of non-labials in the same manner and voicing class. In other words, when the place of articulation of a consonant is obvious, children tend to sacrifice some other aspect of production such as voicing or manner.

Child 4

FIGURE 7

Child 4 had perhaps the most complex phonological system of the group. He was also most like other, non-cleft children in his strategies for producing speech and, in a sense, the most accurate child in that both voicing and place of articulation were generally preserved. He produced nasal stops or nasalized oral stops for both stops and fricatives. His productions were frequently accompanied by nasal resonance or audible nasal air, but voicing and place were correct. The only exception to this was his production of affricates. Affricates (/tʃ/ and /dʒ/) only occurred in the imitative sample where they were produced as glides, but again with voicing and place of articulation preserved. Word-finally, the pattern was very similar to that observed word-initially except that sibilant fricatives became [h].

SUMMARY

FIGURE 8

All of these children were the same age and at roughly the same stage in their productive language development. They all had inadequate velopharyngeal function as they attempted to learn to produce speech. They were like other non-cleft children in that they tended to substitute stops for fricatives, often preserving both voicing and place of articulation. They were like other, non-cleft children in some of the phonological processes that occurred including assimilation and consonant cluster reduction.

FIGURE 9

They were unlike other non-cleft children in their frequent substitution of [?] and [h] for obstruents. Unlike non-cleft children, oral stops were frequently nasal or nasalized, produced with a secondary glottal constriction or with audible nasal air. For some children, in some contexts, place of articulation was preserved for only the most visible consonants, the labials.

Some of the differences observed in these children may be the natural outcome of attempting to produce speech with VPI, but others appear to be active attempts to circumvent an inadequate mechanism. From a clinical perspective, many of the strategies may seem undesirable, but from the child's perspective, this may not be the case. They may represent the child's best attempt to sound like others.

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SUBJECTS

2 BOYS

2 GIRLS

Clefts Surgically Repaired
Mean Age: 30 months 20 days

Figure 1

General Description
of Obstruent Production

Obstruents ---› Sonorant

Systematic relationship between target and production

Some aspects of target preserved

Figure 2

CHILD 1

oral stop ----› [ʔ] or glottalized oral stop

+voice fricative ----› nasal stop

-voice fricative ----› -voice stop or fricative with NE

Figure 3

CHILD 1

"doggie" -----› [ʔɔʔɻ]

"take it off"---› [haʔɪnɔf]

Figure 4

CHILD 2

+voice stop ----> nasal stop

-voice stop -----> [h] (initial) [?] (final)

fricative -----> [h] (initial) [?] (final)

Figure 5

CHILD 3

+ voice obstruent ----> +nasal stop

- voice obstruent ----> [h] (initial) [j] or [h] (final)

/p/ ----> [m]

/z/ ----> [h]

Figure 6

CHILD 4

stop ----> correct with NE

fricative ----> stops with NE

tʃ -----> [h]

dʒ -----> [j]

Figure 7

LIKE NON-CLEFT

1. fricatives -----> stops

2. assimilation of place

3. cluster reduction

Figure 8

UNLIKE NON-CLEFT CHILDREN

1. Frequent use of [ʔ] and [h]

2. oral stops -----› nasal, glottalized, or NE

3. primarily labial place preserved

Figure 9